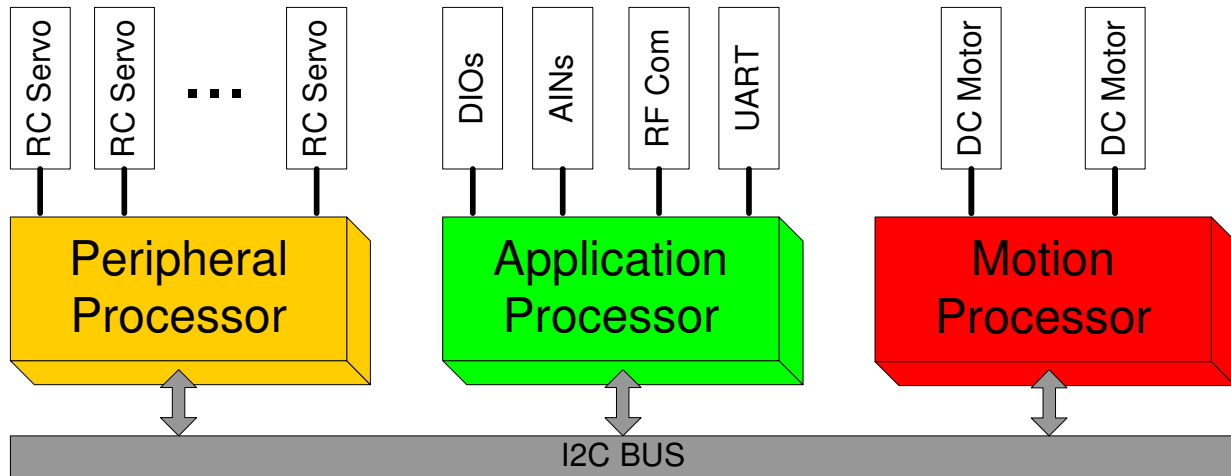
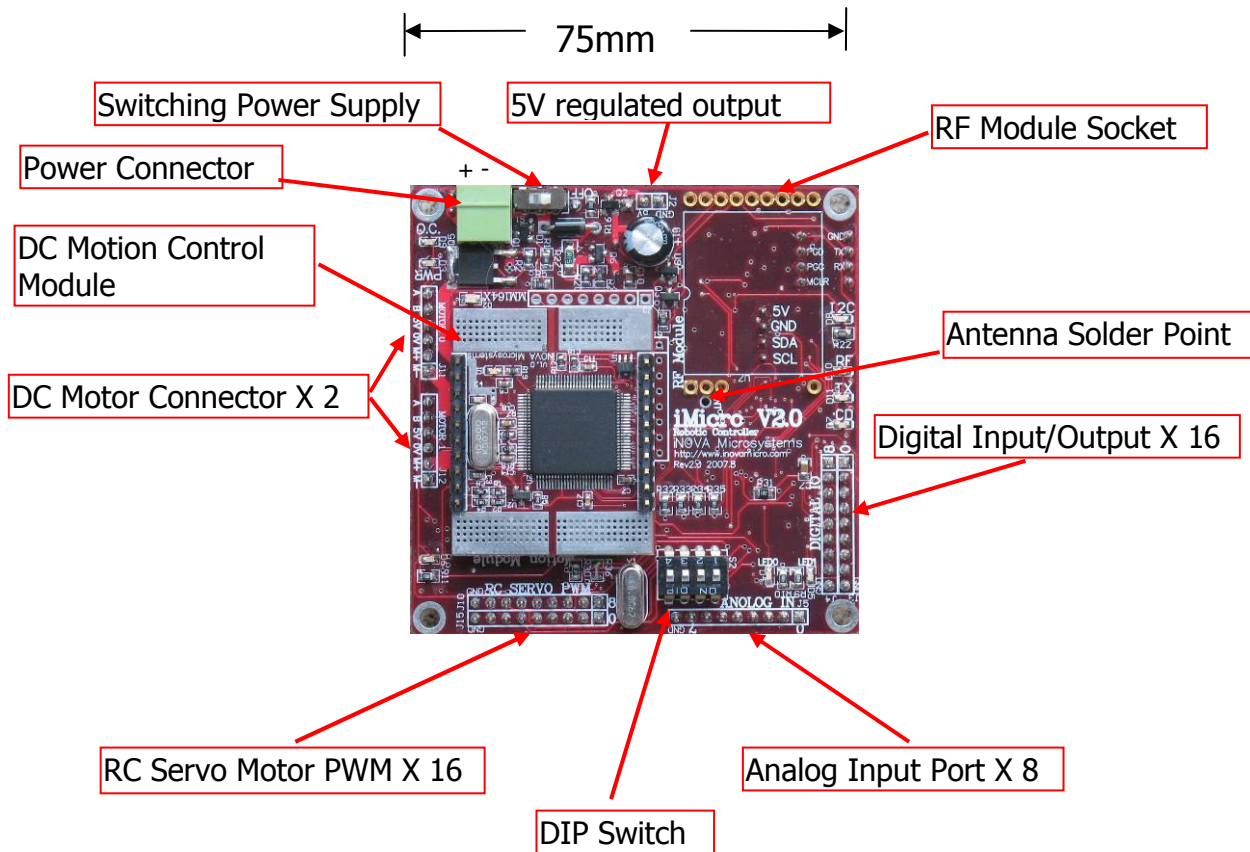


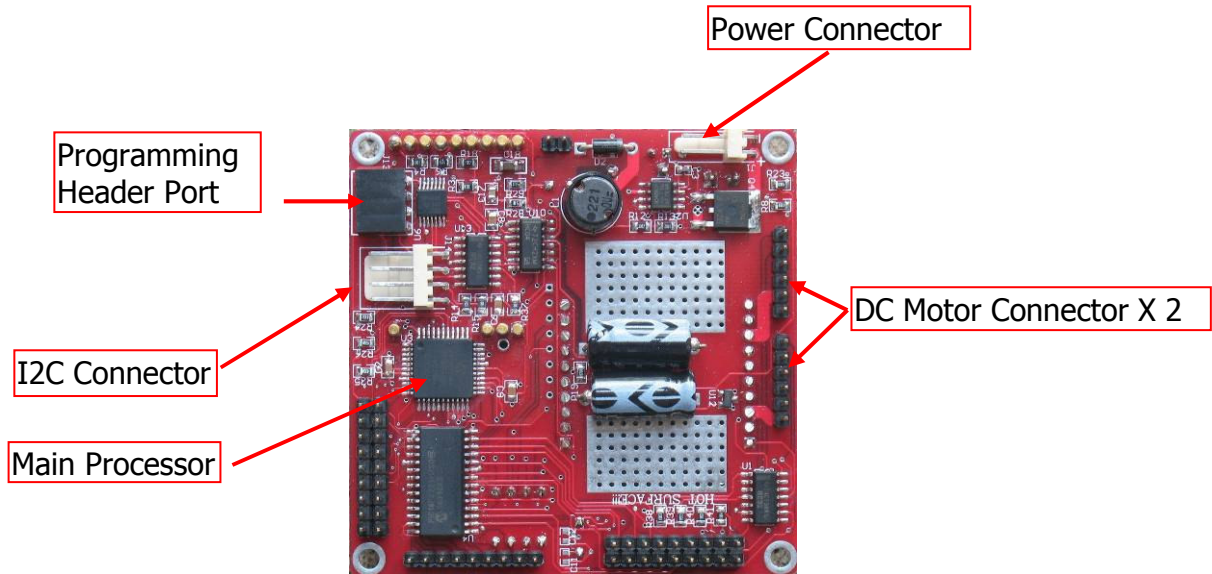
iMicro Hardware Architecture



I2C Address of Peripheral Processor and Motion Processor is **0x50**

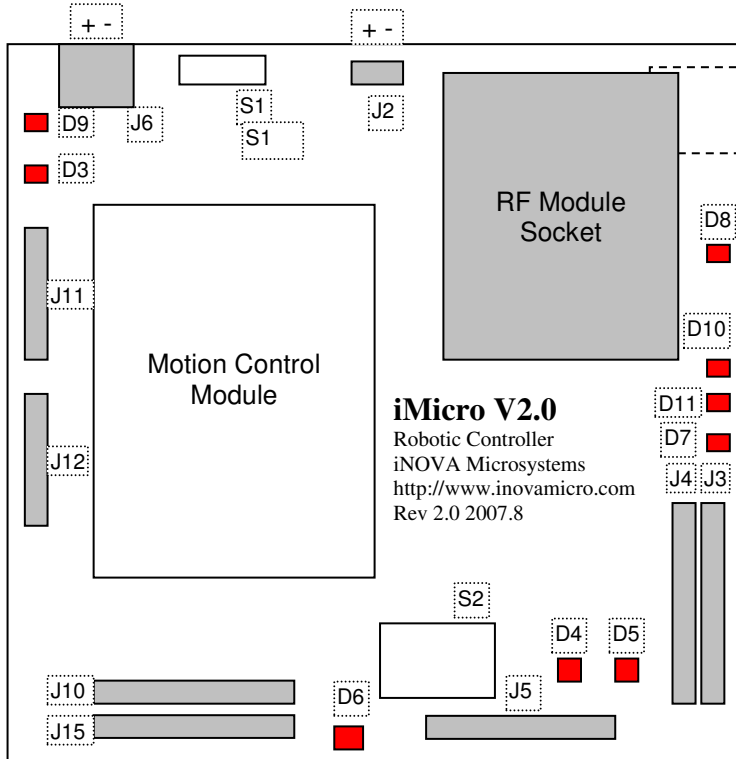
iMicro Hardware Description



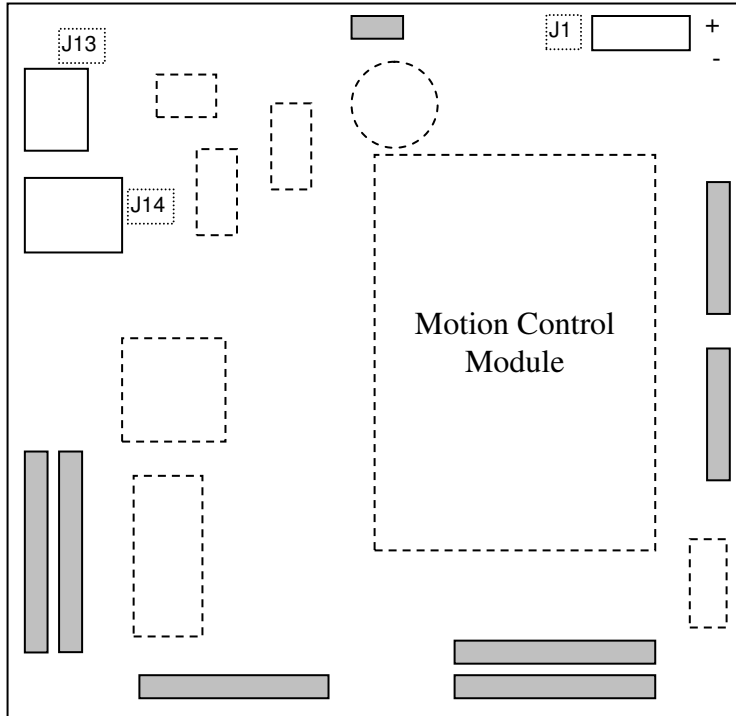


Technical Specification

Item	Specification	
Power Supply Voltage	7V – 25V	
Power Supply Current	Max 6Amp	
Power Consumption	2W (without motor)	
Processor Speed	40MHz	
5V regulated out current	Max 800mA	
Digital IO type	TTL	
Analog Input Range	0V - 5V	
RC Servo PWM Pulse	TTL, 25Hz	
DC motor PWM frequency	40Khz	
DC Motor DC current	Max DC Current = 5 Amp	
DC Motor Pulse current	Max Pulse Current = 20 Amp	



TOP View



Bottom View

PCB Connector Table

Designator	Description	
J1, J6	Power Supply Connector	
J2	On-board 5V regulated output	
J3	Digital IO Ports (P0 – P7, GND)	
J4	Digital IO Ports (P8 – P15, GND)	
J5	Analog Input Ports	
J10	RC Servo PWM Output (RC8 – RC15)	
J11	Motor 0 Connector	
J12	Motor 1 Connector	
J13	Programming Header	
J14	I2C Connector	
J15	RC Servo PWM Output (RC0 – RC7)	
S1	Power Switch	
S2	ID Switch	

1. Power Supply (J1, J6)

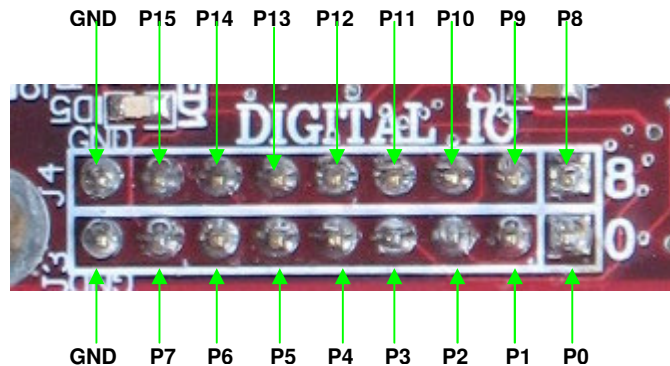
The acceptable power supply of iMicro is ranging from 7-25V. The power supply will supply power to the internal digital circuitry as well as the DC motors.

2. 5V Regulated Output (J2)

The iMicro provides a 5V regulated output (J2) for external circuitry. The output current limit is **0.5A**.

3. Digital Input/Output Port (J3, J4)

The digital ports can configured as input or output individually by software. All ports are TTL/CMOS level. The following table shows the how digital IO pins are connected to the main processor PIC18F4620

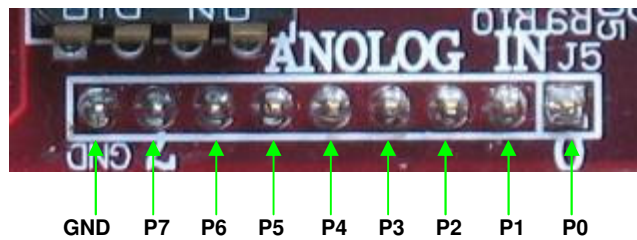


iMicro Digital IO port	PIC18F4620 Pin
P 0	RD0
P1	RD1
P 2	RD2

P3	RD3
P4	RD4
P 5	RD5
P 6	RD6
P7	RD7
P 8	RC0
P 9	RC1
P10	RC2
P11	RC5
P12	RB3
P13	RB2
P14	RB1
P15	RB0

4. Analog Input Port (J5)

All 8 analog input ports are multiplexed through a 10-bit 100Khz ADC (Analog to digital converter). The default input range is 0V to 5V. The range can be changed by adding external voltage references. For more information, please refer to PIC18F4620 datasheet. The following table shows the how the analog input pins are connected to the main processor PIC18F4620

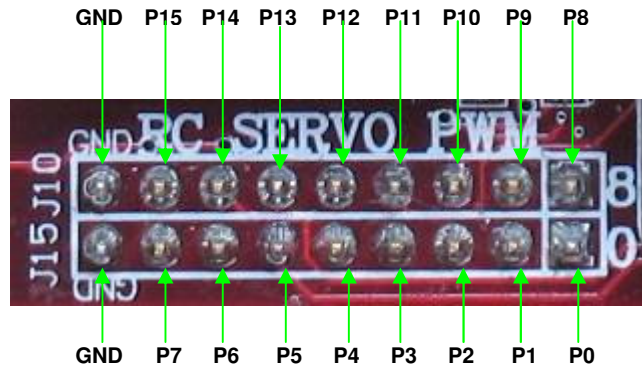


iMicro Analog Input Port	PIC18F4620 Pin
PORT 0	RA0/AN0
PORT 1	RA1/AN1
PORT 2	RA2/AN2
PORT 3	RA3/AN3
PORT 4	RA5/AN4
PORT 5	RE0/AN5
PORT 6	RE1/AN6
PORT 7	RE2/AN7

5. RC Servo Motor Control Port (J10, J15)

The RC servo control port produces 16 independent PWM signals to control RC servo motors. Each pulse can be varied from 1.0ms to 2.0ms by software. The period of the RC servo pulses is 40ms. The smallest variable step is 0.1uS.

The pin configuration is shown below



6. DC Motor connector (J11, J12)

iMicro can drive 2 DC motors. With incremental encoder feedback, it is able to control the speed and position of the motor. J11 is to connected to Motor 0 and J12 is to connected to the Motor 1.

The motor connector is 6-pin square pin header. The pin layout is as follows.

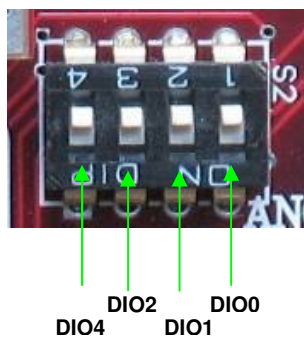


- Pin 1 (M-): Motor-
- Pin 2 (M+): Motor+
- Pin 3(0V): Digital Ground
- Pin 4 (5V): Digital Supply
- Pin 5 (B): Encoder Channel B
- Pin 6 (A): Encoder Channel A

Each channel has MAX DC current = 5A, Max pulse current = 20A

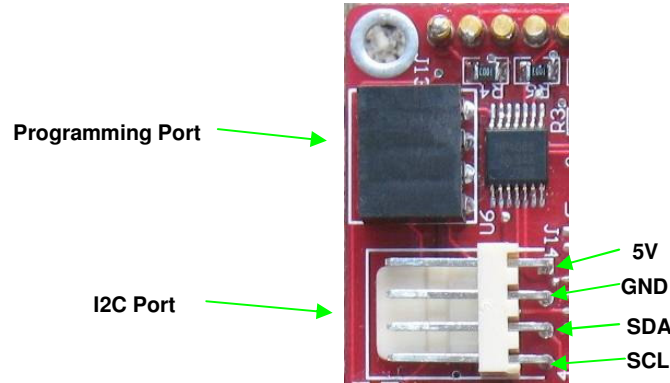
7. ID Switch (S2)

iMicro board has one 4 way DIP switch that can be use to implement ID for robotic application. User program is able to generate the ID by reading the Digital IO ports.



8. I2C Port Connector (J14)

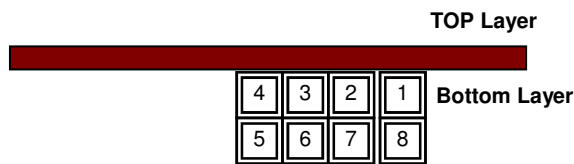
iMicro has implemented I2C master. The I2C port can be used to connect other slave device like motor drivers and digital compass. Both SCL and SDA pins are pull-up to VCC internally by 1K resistor.



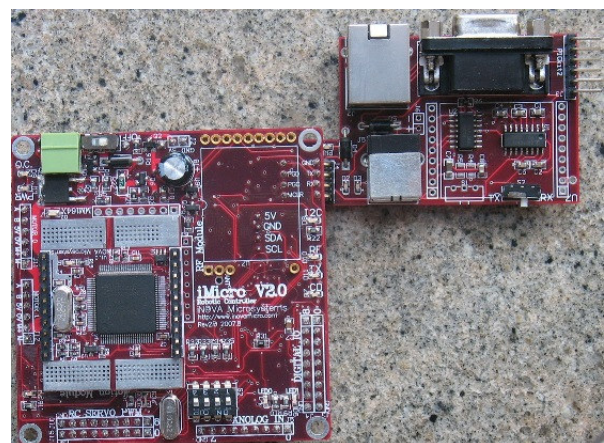
9. Programming Port and UART (J13)

The programming port contain the signal for Microchip ICD2 debugger and UART. It is designed to mate the Programming Adaptor to provide debugger interface and RS232 interface. For detail about the Programming Adaptor, refer to Programming Adaptor – Hardware Guide.

The pin layout of the programming port from the side view is as follows.



- Pin 1: GND
- Pin 2: UART_TX
- Pin 3: UART_RX
- Pin 4: N.C.
- Pin 5: MCLR (RESET)
- Pin 6: PGC
- Pin 7: PGD
- Pin 8: 5V

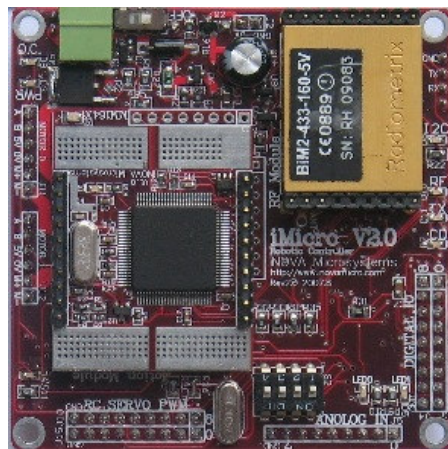


10. RF module interface

iMicro has implemented the interface for Radiometrix® BIM2 and BIM3 RF transceiver modules. The detail information can be found at the following links.

- <http://www.radiometrix.co.uk/products/bim2.htm>
- <http://www.radiometrix.co.uk/products/bim3a.htm>

The interface is directly compatible with these modules. Below shows the iMicro board mounted with BIM2 modules.



LED Indicator Table

Designator	Description	Color
D3	Power Supply Good Indicator	Green
D4	User Programmable LED0	Yellow
D5	User Programmable LED1	Yellow
D6	Peripheral Processor Indicator	Green
D7	RF carrier detect indicator	Green
D8	I2C Bus activity indicator	Red
D9	Power Supply Failure Indicator (Low Voltage)	Red
D10	RF communication Enabled indicator	Red
D11	RF Receiver/Transmitter indicator	Red

1. D3 Power supply good indicator
The D3 will turn ON when the board is sufficiently powered.
2. D4, D5 User Programmable LED

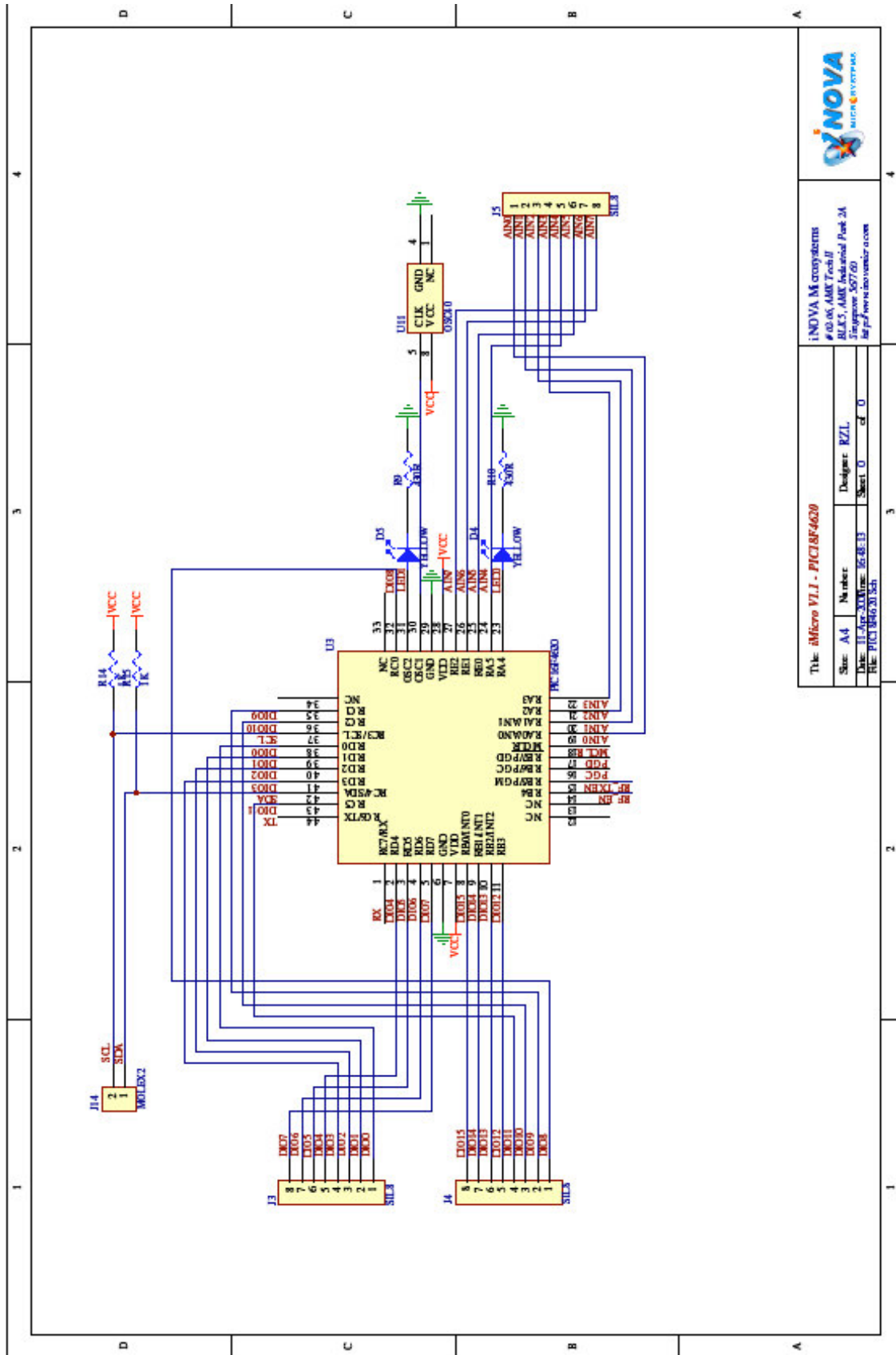
iMicro has implemented 2 LEDs for user to use in the programming. The LEDs are directly connected to the PIC18F4620 processor.

	PIC18F4620 Pin
LED 0	RA4
LED 1	RA6

3. D6 Peripheral Processor Indicator
D6 is controlled by the peripheral processor. It will blink if there is activities on the internal communication bus.
4. D7 RF carrier detect indicator
D7 is to indicate if there is carrier signal presented. It can be used to tell if the frequency band is occupied.
5. D8 I2C Bus activity indicator
When there is activity on the I2C bus, D8 will turn ON. D8 should blink for normal operation. If D8 remains ON, it suggests a I2C bus failure.
6. D9 Power Supply Failure Indicator
D9 is turn ON when the supply voltage is too low that the on-board power supply unit is not able to maintain 5V output. It can be used to indicate low battery situation.
7. D10 RF communication Enabled indicator
The UART of the main processor is multiplexed to RF module and RS232 circuit. D10 is turn ON when the RF communication is selected to connect to the UART. D10 is OFF when the RS232 circuit is selected to connect to the UART.
8. D11 RF Receiver/Transmitter indicator
For Radiometrix® BIM2 and BIM3 RF transceiver modules, if the Transmitter mode is selected, the D11 will be ON. If receiver mode is selected, the D11 will be OFF.

PIC18F4620 Schematics

The schematics shows the connection between the on board PIC18F4620 and IO ports.



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Title: iMicro V2.1 - PIC18F4620

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Date: 11 Aug 2008	Rev: 08-13	Sheet: 0 of 0
File: PIC18F4620.Sch		